THYRISTOR DEVICE WITH CARBON LIFETIME ADJUSTMENT IMPLANT AND ITS METHOD OF FABRICATION

Related Data:

[0001] This application is a continuation in part of U.S. patent application serial number 10/231,805 filed August 28, 2002, now U.S. PAT. NO. 6,653,175 which is a divisional of U.S. patent application serial number 09/814,980 filed March 22, 2001, now U.S. Pat. No. 6,462,359 and issued October 8, 2002, the disclosures of which are hereby incorporated by reference in their entirety.

Field Of The Invention:

[0002] The present invention is directed to semiconductor devices and, more specifically, to semiconductor devices including thyristor-based memory and to carbon lifetime adjustment implants to enhance leakage currents and stabilize operations thereof.

Background:

[0003] The semiconductor industry has recently experienced technological advances that have permitted dramatic increases in integrated circuit density and complexity, and equally dramatic decreases in power consumption and package sizes. Present semiconductor technology may now permit single-die microprocessors with many millions of transistors, operating at speeds of hundreds of millions of instructions per second, to be packaged in relatively small semiconductor device packages. As the use of these devices has become more prevalent, the demand for faster operation and better reliability has increased.

[0004] An important part in the circuit design, construction, and manufacture of semiconductor devices concerns semiconductor memories; the circuitry used to store digital information. Conventional random access memory devices may include a variety of circuits, such as SRAM and DRAM circuits. SRAMs are mainly used in applications that require a high random access speed and/or a CMOS logic compatible process. DRAMs, on the other hand, are mainly used for high-density applications where the slow random access speed of DRAM can be tolerated.

[0005] Some SRAM cell designs may be based on NDR (Negative Differential Resistance) devices. They usually consist of at least two active elements, including an NDR device. The NDR device is important to the overall performance of this type of SRAM cell. A variety of NDR devices have been introduced ranging from a simple bipolar transistor to complicated quantum-effect devices.